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May 6th, 1929—L. A. Souch, U. S. N. with Wright Apache plane, Anacostia, D. C. Altitude 35,146 feet. Powered with Pratt & Whitney Wasp motor using GULFPRIDE OIL 120.

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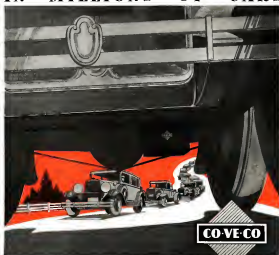
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AVIATION

THE OLDEST AMERICAN AERONAUTICAL MAGAZINE

A MONTHLY-REEL PUBLICATION ESTABLISHED 1914

EDWARD F. WARNER, Editor

PUBLISHED BY ... **November 2, 1929** ... 4 DOLLARS A YEAR



Personnel Now or Progress Later?

FOR AT LEAST two years, the aircraft industry has been the sufferer from a chronic personnel shortage. The demand for trained men, trained as engineers, production experts, or operations managers, has persistently run far ahead of the supply. Each year's output of the aeronautical engineering schools of high standing has been snuffed up before the day of graduation. Companies have raided each other's staffs, which is temporarily upsetting to the factory that loses the men but means little to the course of development of the industry as a whole. It is infinitely more serious that they have found a gold mine of personnel in the Department of Commerce, in the National Advisory Committee for Aeronautics, in the laboratories of the Army and Navy, and in the universities.

The orderly progress of American aviation, and the steady improvement of its products, is completely within the control of the Department of Commerce. The recordsmen of rapid industrial development with the endorsement of all greater safety precautions is quite impossible unless the *Aviation Branch* is adequately staffed with competent men, and unless the turnover of its personnel is kept low enough to insure that there will be continuity of process and that the number of new men just leaving their work at any given time will be reasonably small. While these conditions have so far been met, it has been only because of the nature of the staff have taken as a new job just starting and because of their personal loyalty to their desks. As the Department's aeronautical activities settle down towards routine the probability of successful mass raids on its personnel, such as the *Automotive* section of the Bureau of Standards recruited a few years ago and such as the National Advisory Committee has several times experienced, becomes steadily greater.

The industry cannot move forward without constant dependence upon research, and it has been spared the

misery of paying the bills for the research done by the willingness of the National Advisory Committee for Aeronautics to attack the industry's collective problems and solve them for the general good. The Committee's work has been of untold benefit. It is very poorly rewarded, as Dr. Ames, the Chairman, pointed out at the last industrial conference at Langley Field, by having its most promising men stolen away as soon as their training has progressed to a point where they begin to be really useful.

The point need not be further labored by illustration. Wright Field, the Naval Aircraft Factory, and the universities suffer in the same way. The problem of keeping up a competent teaching staff, in particular, has become literally desperate. The industry may turn out more and better airplanes next year by grabbing the best trained men without regard to where they are to be found, but the quality of the product of 1930, and the breadth of the market then and later, will be disastrously affected by robbing research or interfering with the training of the young experts who should be getting ready to step into responsible positions a few years hence. This is a time for forethought.

The solution is not easy to find. There can be no competition with the industry as salaries. The government departments are directly limited by law and by the rules of the Civil Service Commission for uniformity of compensation. The universities are similarly limited by tradition and by the conservative management of the total funds available.

Obviously no one would suggest that any man should be tied down permanently to government or academic work because he has once entered it. Everyone must have a free choice of the employment that is to his best ultimate interest, but at least he ought, having chosen to enter to the government service, to stay there long enough to make good return for the value of the training

and expenditure that he receives during his first month. It seems to me reasonable to suggest that a civilian employee of any of the government's associated laboratories, of the *Aeronautics Branch*, and no instructor in aeronautics at a university, should be approached with a view to private employment, unless the full career of his employer in the work has first been ascertained, until he has been two or three years in his governmental or institutional position. No company can afford to adopt such a policy on its face account. The industry can do it collectively through joint agreement of all the large companies, and the industry collectively would gain much more than it would lose by such action.

We have discussed the subject of such a self-dragging ordinance with the principal executives of a line of the leading manufacturing companies, and the proposal has been received with enthusiasm. Now we try to believe the whole industry, as a challenge to their co-operative spirit, their interest in the promotion of aeronautical research and aeronautical education, and to their far-sightedness and belief in their own future.



Light Loading or Heavy?

THE AIRPLANE OF 1929 has made a long march towards the potential possibility of flying a tri-motor with enough power. Wing area has been clipped and trimmed again and again. Wing loadings have increased steadily, and stand now at levels unimagined a few years ago. Conventional commercial machines for general cross-country use are carrying a weight per unit of wing area beyond anything dared in racing planes when serious international racing first began.

When a tendency in design manifests itself so strongly, and when it continues over a number of years almost without check, there is a strong presumption that the path being followed is a wise and correct one. But a presumption is not a guarantee. It still remains to be proven that the direction in which we have been moving is the right one for all loads and under all conditions.

The Congressional Safe Airplane competition has brought the issue dramatically to the fore. To the horror of some of the industry's engineers, the rules for the competition were so drawn as to put a tremendous premium upon light wing loading and, in fact, deviously to tempt it to figures well below the common range of present practice.

It is no wonder that universal agreement is lacking. The airplane designer finds himself impelled in both directions. Undoubtedly the use of high wing loadings and high loading speeds is conducive to economy, and to the high cruising speed which is so eagerly sought. To reach at 120 mph. in a plane with a loading speed of 80 mph. costs several times as much per unit of distance and pay

load as to travel at the same speed with a machine capable of flying below 75. If airplanes could be assured against forced landings, and against ever having to make use of any except the most perfect airports, we might look forward hopefully to increases of wing loading, to 15 lb. per square ft. or more in commercial types, to the extent of still higher maximum speed at reasonable rates.

Unfortunately it is equally beyond question that, other things being equal, the airplane which loads most slowly is the safest. Since it was for the specific purpose of developing the design factors conducive to safety that the Congressmen's competition was formulated, low speed takes an important place. In case of trouble the lightly loaded plane can get down when one with twice the wing loading has no chance of escaping injury. In the event of a real crash, as when the necessity of parachuting on the wings arises, it has a much better chance of saving its passengers from serious consequences. Where shall the designer turn?

There is no single solution. For transport airplanes, and especially for those with multiple engines, or those likely to be used over good flying country, unit loadings may be expected to increase steadily. Improvement in power-plants and in runway surfaces, and the general tendency to increase the size of airports, will make that feasible without any regard to what advances may be made in airplane design itself. For the taste of many private owners, however, too much progress has already been made in that direction. We cannot directly balance safety against economy, for safety is the first essential, but we can consider for each type how far we are justified in going in the search for economy and speed before conditions of undue danger are reached. There should be no standard trend in wing loading, or, rather, there should be a trend in both directions. Clearly the selection of appropriate wing loading for specific functions should receive more attention than it frequently does at present, and the spread between the lightest and the heaviest loadings used should be further increased.



Cultivating Airplane Sales Soil

SOME AIRCRAFT BUILDERS in the light and medium airplane market have recently experienced what was called, "unexpected sales resistance." When a country whose population exceeds 120 million people is seen as a market for any type of aircraft should be so quickly saturated after the recent displays of undrained air-mindedness. The answer is that while there is an interested public, there is not as yet an airplane-buying public, at least not in the sense that there is an automobile-buying public. It is possible to sell an automobile to almost any human being,

regardless of age, sex, or condition, who can find the purchase price. In selling an airplane it is first necessary to teach a man to fly and then to find something for him to do with the plane after he gets it.

When we evaluate the sales possibilities of pilots or those who are training to become pilots we have about saturated the immediate airplane market and it becomes necessary to go out and teach mass people to fly. Here sales to large corporations are made through pilots, and the factory which does not have a following of pilots must either build one or be forced out of the business of building and selling airplanes.

Nothing is more vital to the progress of aviation at this time than the cultivation of flying schools by aircraft builders.



More and Better Navigation

TO THE AVERAGE private pilot, navigation still means following a railroad line. He may go the length of using a compass corrected for deviation and making at least an approximate correction for drift. Beyond that point, unless he be one of a very select and experienced group, he respectfully submits the navigator's art as one of the Seven Deadly Mysteries.

For going from Port Worth to Wichita, or from Atlanta to Richmond, the prevailing practice do nicely. Over some of the least thickly settled regions of the United States they do less well. Over pathless areas, or regions pathless desert or jungle, they do not do at all as a regular reliance—without the aid of the success of Lindbergh and a few others in hitting their marks after long voyages with only dead-reckoning and a compass for their guide. Those who have been successful by such methods are the first to avow that some element of good luck went into it if the goal is to be hit exactly.

For most purpose "handmade flying" or dead reckoning, recklessly backed by radio, continue the safe reliance. If plans are to cross the ocean, and particularly if they are to make use of artificial islands or mid-ocean bases, low speeds in an infinite waste of water, they must have more. Whatever use may be made of radio, the navigation of sea-going airplanes must, like the navigation of surface craft be able to determine their location by their own resources. The sun or stars must give them all they need.

Celestial navigation for aircraft is in a serious and unimproved position. The theory has been exhaustively studied. Bred, Davis, De Agazio, Weems Hegenberger and others have not alone have labored to devise better instruments and samples and simpler tables for the special needs of the aerial traveler. Adair, Crawford de Sabard, Hegenberger, and Curtis, among others, have given repeated proof of the possibility of finding out the way directly from point to point without ever using the

ground and with no radio beams installed. To the great body of their fellow-pilots the subject remains a closed book.

Many of them will no doubt get through their active flying careers without ever needing to use a system, but none of them ought to get far without knowing what it is. The statement continues no unfortunately recent. It is used successfully every day by fishing slippers whose formal education stopped almost before it had begun. No airplane pilot need content himself unable to master his workings.

An explanation of celestial navigation, and especially of its limitations, ought to be a part of every transport course. A large plane will have a professional navigator, but the pilot must know how exact his statements are likely to be, and how close a course the observations of heavenly bodies should enable him to steer. He should be taught these things as a matter of course. Equally important, the Navy, to which aerial navigation is a life-and-death matter, should continue its resources and refinements and make them public. Data on the causes of error are still inadequate. The Navy, which publishes the *Nautical Almanac* and most of the best navigation tables, should supply them.



Wall Street's Crash

THE great stock-market collapse of October 29 has attracted as much attention in the aeronautical industry as elsewhere. It has spelled embarrassment for many individuals, and after disaster for some. It has been accompanied by the usual flurry of columnist prognostics that the end of the world is at hand.

This is a time for realism. The violent crash of Thursday a week ago removed a number of co-builders of paper profits from among the potential purchasers of airplanes, and to that extent it will register unfavorably upon next year's sales, but upon the ultimate stability of the stronger part of the airplane industry it will have no effect whatever. It might be a serious matter if new capital were urgently needed, but fortunately the industry amassed a valuable fund of capital during the past spring. The financial position of most if not all of the larger producers insures their ability to weather any storms of the present stock-market cycle without new appeals for funds.

No airplanes are built at the corner of Wall and Broad Streets. The progress of aviation does not depend upon speculative profits. We shall do ourselves a very bad turn if we permit the excitement of the speculative markets to create the impression that the would-be maker of a "quick turn" is the dominant figure in our industry. The future lies with those who stay with the building and marketing of airplanes through fair weather and foul, indifferent to the hourly fluctuations of the ticker

THE TOUR ARRIVES AT DETROIT

John Livingston, Flying Whirlwind-Waco, Wins First Place With a Grand Total of 45,672.64 Points

By JOHN T. NEVILL
Detroit Editor of Aviation

FLYING LOW leaves a 700 ft. ceiling and in the face of exceedingly poor visibility, through fog and rain that very nearly upset a remarkable record during the final 100 miles of a 5,017-mile flight, the 1929 National Air Tour—24 competing planes and 30 or more accompanying crash-landed safely on Ford Airport, Detroit, Monday, October 21.

It was a difficult job, that last leg, the most trying of the entire Tour, but all of the 25 entries still left in competition in Kalamazoo, the final noon-day stopping point, got through except one. Capt. William Lancaster, English pilot, flying an American Circus-owned Great Lakes trainer, suffered engine trouble shortly after his take-off from Kalamazoo and damaged his plane in landing. Through untimely sever of the competing pilot, Capt. Lancaster will be officially regarded as a finishing pilot, and will receive a check for \$350 awarded to him as such. The Tour, however, actually ended at its starting point with 24 of the 29 starting craft, five of the entries having withdrawn either because of motor

trouble or plane damage. Within an hour after the last plane had landed the stunts were carried as tightly over lower Michigan that the Tour pilots were storm-bound in Detroit for several days.

As could be safely forecast at the event's beginning on October 5, accident or excessive motor trouble excepted, the 1929 National Air Tour, and the Edsel B. Ford reliability trophy, plus the \$2,500 cash prize that goes with it, went to John Livingston, pilot of a Waco straight-wing biplane, powered by a 225 hp. Wright engine. Livingston's "figure of merit" 1,429.29, equaled with the best that he flew every one of the Tour's 32 legs as this has scheduled time, made it responsible for my comment to last issue. Throughout the 5,000 miles Livingston maintained a speed of 115.12 m.p.h., or better. His course laid 922 ft., the Department of Commerce officially rated last for the Waco "225" although under the rules he was required to carry only 75 per cent of that load.

With no record to detract from the visible ability of Mr. Livingston to navigate his ship over the prescribed course, some parts of which forbade any deviation from a straight line-to-line route, the lack "figure of merit" which entitled the Waco pilot to walk away with victory was, no doubt, the result of the ability of his ship,

when backed by his own piloting skill, to land and take off within an exceptionally brief space of time. In the pre-Tour tests made at Ford Airport Livingston set a "stark" record of 14 seconds, and an "average" record of 44 seconds.

Livingston's triumph brought to the Waco Aircraft Company, of Troy, Ohio, for the second consecutive year, the Edsel B. Ford trophy, the 1928 Tour having been won by the late Major John P. Wood, of Waco, Wis., with a Waco 10 also equipped with a Wright engine. The trophy goes permanently to the company winning it three successive years.

A Waco "225" also took second place in this year's Tour, Arthur J. Davis, of Lansing, Mich., scoring just before his turn-outs, and winning a cash prize of \$3,000. Davis held the next to highest "figure of merit" and flew the route with only one "superior score." Third place was won by a tri-engine Ford, powered by a Wasp and two Wright 300's, fourth by a Curtiss Condor, equipped with two geared Continentals.

The ten cash prize winners in order, place, power plant, pilot, total score, and amount of prize follow:

Waco, Wright 225, John Livingston	45,672.64	\$1,000
Waco, Wright 10, Arthur J. Davis	34,414.12	500
Ford, 3 Wasp, 2 Wright, A. J. Davis	34,414.12	1,000
Waco, Wright 10, Charles W. Hays	33,736.76	1,000
Waco, Wright 10, George W. Hays	33,736.76	1,000
Waco, Wright 10, Robert Smith	33,736.76	1,000
Waco, Wright 10, Charles W. Hays	33,736.76	1,000
Waco, Wright 10, Charles W. Hays	33,736.76	1,000
Waco, Wright 10, Charles W. Hays	33,736.76	1,000
Waco, Wright 10, Charles W. Hays	33,736.76	1,000
Waco, Wright 10, Charles W. Hays	33,736.76	1,000

OPPONENTS TO FINISH, in their order of standing, were: Stanley Seaton, 235 Wright Cirrus, Dale Jackson, 225 Wright Cirrus, Joseph Morris, Warner Gross, Steve Lantz, 335 Wright Cirrus, Richard W. Pease, Wasp 10, Charles W. Hays, American Great Lakes Trainer, Wiley Post, Wasp Lockheed, J. L. McGraw, 235 Wright Cirrus, Russell Young, 300 Wright Cirrus, Al Kerkow, Gypsy Moth, Buden Wagner, Homer Dong 95, W. Gentry Shuman, Curtiss Challenger Robby, Miss Alice Hurler, Keweenaw Eagle, and Nevanne Walkow, 300 Wright Travel Air.

Miss Miller, winner of eighth place, is the first woman to place "in the money" in any National Air Tour since the vacation was started in 1925. The Tour, this year, consisted of three success occasions. Miss Miller, Miss Hurler, and Miss Parsons Hurler, whose plane, a Gypsy Moth, was wrecked in Cincinnati. The girl pilot was not in any way at fault in the mishap, which resulted from another plane cutting in on her as she was about to land.

Livingston was presented with the Edsel Ford trophy following a banquet in one of the Ford bungalows at the



The Tour planes at the Whelan Airport, Albion, Mich., photographed from the air.

airport shortly after the event's morning finish. The presentation was made by William B. Scott for Edsel B. Ford. The cash awards were handed out the following day at a downtown luncheon by William Mayo, chief engineer of the Ford Company.

At the luncheon it was announced by Captain Roy Collins, manager of the Tour, that checks for \$250, the award going to any finisher, would also go to the five pilots who started and failed to finish. These contestants were Don Maher, who wrecked his Wallace Tanager in Buchanan, Miss Blawie, who wrecked her Math in Cawthron, D. Morgan Hackman, who wrecked his in Fordville, N.Y. between Springfield, Mo., and Wichita, Kansas, and whose Great Lakes Tanager came to grief during the very last leg of the long route, and Forest O'Brien, withdrawn by his company because of engine trouble. Dale Jackson, of exclusive fight fame, was awarded a special \$100 entry reward for his Tour headquarters by the Standard Talking Co., of Bridgeport, Pa., to be awarded at the Tour manager's discretion. Captain Collins asked the contestants for suggestions as to disposition of this money, and it was moved, seconded and voted that that should go to Jackson for having flown every leg within scheduled time and yet not having placed "in the money." Jackson and Livingston, incidentally, were the only two contestants with such a record, although there were a number of others nearly. Hildebrand, Davis, Keller, Shuman and Post, who made only one imperfect score. Four others, Gross, Wagner, Warner, and Pease, were also out of control points only once.

Charles W. Hays' chief staff pilot for the Great Lakes Aircraft Corporation, Cleveland, O., explained during the closing the terms under which pilots entered in the 1929 Tour will compete for the Great Lakes Trophy.

Competing planes at the Ford Airport at the start of the 1929 National Air Tour.



Prize trophy next year. The trophy, Mr. Meyer said, will go to the craft equipped with an engine of 310 cc in displacement or less aggregating the highest number of points under the conditions stipulated by the Standard Air Tour. Like the Elmer B. Ford trophy, the Great Lakes trophy will become the permanent property of the manufacturer winning it for three successive years.

Major Clarence M. Young, Assistant Secretary of Commerce for Aeronautics, Mr. Meyer, and Louis Chappin, chairman of the Corporate Council, N.A.A., who were present at the luncheon, congratulated the pilots and Tour officials on the splendid manner the event was carried out. A brief discussion of the time and route of next year's Tour was held, but that will be incorporated in a later article. Stronger Coffin announced that a meeting between commercial airplane manufacturers and sponsors of the Tour would be called sometime within the next 30 days to discuss plans for the 1960 cruise.

Afternoon nearly 1,300 miles shorter, the 1959 Air Tour seemed somewhat more difficult to fly on schedule than last year's event, no doubt due to the more condensed flying schedule, more numerous stops with headwinds, and the 5 per cent higher average speed required. This year the Tour pilots traversed a lot of country where digital and natural resistance by commercial airlines ruled. In fact, he did not seem to the writer that the mileage over such country exceeded that of last year.

There were eight of the contestants who always took turns at averaging the five fastest speeds on every leg; this group consisted of Wiley Post, Steve Lacy, Stanley Scammon, George Holdeman, Bobbie Knight, John Livingston, Arthur Davis, and Reshies Wagner, with a Lockheed, a Boeing, two Cessnas, two Bellmans, and two Waco's. In most cases the Lockheed came through first with Lacy's Cessna second, Post averaging between 150 to 160 m.p.h. on most legs, with occasional bursts of 170 to 180 when favored by the wind. It is noteworthy that the two fastest stops in the Tour, the Lockheed flown by Post and the Cessna piloted by Lacy, were not among the top prize winners.

The quiet efficiency and reliability mentioned throughout the Tour by the experienced pilots is also also worthy of mention. These were about the only pilots who flew entirely around the route, and several others that joined the serial enroute here and there. Especially worthy of mention were the Perseus flown by John L. W. Bryant, the Hughes Field piloted by George Chappin, the Standard Oil "weather ship" flown by Rodney Lancaster, the Goodrich Lockheed and the Texaco Lockheed flown by Lee Schoenbach and Capt. Frank M. Hawks, respectively, the Douglas D-42, piloted by Louis Wendell Brockley, the Columbia "Tweed" amphibian, flown by Roger Q. Williams, the Mohawk Stearman, piloted by Mr. Mulholland, the Cleveland Perseus-Two Travel Air, flown by E. W. (Pop) Cleveland, the Detroit Twin Lockheed, flown by Frank Ryeck, and last but not least the Post and Wiley Post-Waggoner flown by the veterans, Bernard L. Whitten.

In number, Wright engines led all other power plants among the 28 competing crafts, with a total of 16. Pratt and Whitney contributed seven, Cessna Aeroplane and Motor Land, Kinner two, American Gipsy two, Gipsy two, and Warner one. Propeller equipment consisted of 19 Standard Steel, 13 Hamilton, 4 Cessna Wood, 3 Melfi Special, and 1 Harrel. Twenty-eight of the competing craft were equipped with Pioneer and one with Cessna-

dand instruments, several of the ships carrying some of each. There were 24 sets of Beech wheels and landing, two ships with brakes of their own make, and three ships without brakes. Goodrich-headed the tire list, with three equipped on 17 ships. Goodyear tires were found upon nine ships, United States tires on two, and Dunlop on one. Being standard equipment on practically all of the Tour's neo-cooled engines, Solafila magnetos ran away with honors in that field. The only two engines competing in the Tour's first craft, equipped with other ignition units were the two DH Gyphals, both of which used the English BTH coils. Among the spark plugs were 30 sets of IRL, one of Champion, and two English K.I.G. Strongest competitors played a prominent part in the Tour for the same reason as did the Scientific magnetos and IRL plugs. Other accessories noted on a large percentage of entries included Aural shock struts, Edoxas starters, Berry Bros. finish, and Harnbeam tie rods.

Since a decision of the first 14 legs of the Tour between Detroit and Jacksonville, Fla., has been published in an earlier issue of *AVIATION*, this article will pick up the day-by-day story at Jacksonville and carry it forward to the finish.

When 28 or 29 planes still in the morning, the National Air Tour began its second week of flying at Jacksonville, Fla., on Sunday, Oct. 12, a 200-mile loop in Macon, Ga., being made in the morning and a short 72-mile flight to Atlanta, Ga., in the afternoon.

Completion of these two legs meant that the Tour had covered a distance of 2,263 miles, or, a little less than half of the 5,017 miles included in the Tour route. So Atlanta was merely a two-day stop, the only two-day stop of the Tour, and then the pilots spent the week-end going northwest from Jacksonville somewhat better flying country was encountered, especially as compared with the 200-mile loop between Augusta and Jacksonville. Moderate northeast surface winds across the course of flight, hindered more than they helped the pilots on the afternoon leg. The best flying leg, Mr. Andrews, the meteorologist, reported, was to be about 4,000 ft. and conditions were so relaxed the sky became overcast with a ceiling of 2,000 ft., most of the pilots preferred staying under the ceiling and putting up with the less favorable winds. The overcast sky, however, contained only for about 50 miles below them a broken rapidly and clear sky. The weather was perfect. Newsman Wadlow, pilot of the Travel Air entry Frances Barrell, is a Moth, and Harrel Young is a Ryan, were the only three who started from Jacksonville as absolute zero and were late into Atlanta. The Wagoner-powered Cessna, formerly flown by Earl Rowland, had turned over upon landing at Jacksonville and was kept waiting Saturday morning as the Jacksonville field for a new proprietor. When Rowland became ill at Robinson's Cessna entry was flown to it by Augustus by Jack Moffatt, a reserve pilot. When the accident happened, however, it was being piloted by Henry Pinckney. Moffatt was again at the controls when it took off for Macon.

Wiley Post, pilot of the Tour's only Lockheed entry, a Wasp-engined craft, averaged the highest speed of any of the contestants over the Jacksonville-Macon course, but time for the 200 miles took 1 hr. 10 min. 04 sec. at 1 hr. 21 min. and 40 sec. The three next best times were made by George Holdeman (Bellman), 1 hr. 25 min. 23



The Tour photo shot up at Miami Airport, Miami, Fla.

sec.; Bob Knight (Bellman), 1 hr. 30 min. 52 sec., and John Livingston (Waco), 1 hr. 32 min. 12 sec.

With an elapsed time of 38 min. 39 sec. Lacy headed the time made by Post on the afternoon leg of the 72-mile flight to Atlanta. Post's time for that group was 39 min. 05 sec. Livingston was third, with 42 min. 27 sec. Art Davis (Waco), fourth, with 35 min. 35 sec., and Holbrook, fifth, with 34 min. 36 sec. The afternoon flight was made beneath virtually clear skies, with light surface winds freshening north aloft. The flying level for the loop was low, and most of the pilots remained well under 2,000 ft.

The "Perseus" Ford piloted by L. W. Bryant and used as the Tour's official press ship again went "light-sweep," mapping its course over Atlanta, Ga., in order to get a peek at the Georgia-Virginia football game from the air. Bennett Athens and Atlanta, the press ship circled around Stone Mountain in order to give the occupants of the cabin a look at the much-disputed Southern stadium.

One incident was checked up in Atlanta, Roger Q. Williams, who had been accompanying the Tour in a single-engine Cessna, found a small engine problem. The water pump was leaking on Candler Field. The half of the Tour was taken off and land-again installed. Williams again joining the Tour at St. Louis. Don Miller, pilot of the Wallace Tanager, wrecked in Baltimore, repaired the tour in Atlanta with a new Tanager, although not as a contestant.

After having rated over the week-end the Tour pilots began on Monday morning the first of two legs that looked then in Cincinnati that night. The day's average, 391 miles to Marlborough, Tenn., and 246 miles to Cincinnati, seemed to mark the end of the shorter two legs, and the beginning of comparatively long jumps. Furthermore, in traversing the country between Atlanta and Cincinnati the Tour was moved over the southern and the Appalachian ranges, encountering a climb to fairly high altitudes in order to maintain a faster rate of climb in event of engine trouble. Both legs were made under conditions that with increasing headwinds ranging from north to northeast on the upper levels.

The "Perseus" press ship never flew the Athens-Marlborough course direct, but detoured somewhat in order to pass over Chattanooga. It was observed that this ship had to strain 5,000 ft. in order to clear some of the highest mountain passes.

When all of the planes had settled upon "Tennessee Sky Harbor" at Marlborough it was found that seven of them had exceeded their allotted elapsed time in flying the 191 miles, thus suffering ineffectual losses being: Noble Moffatt (Waco), 1 hr. 38 min. 39 sec., and Johnny Livingston is 1 hr. 39 min. 29 sec.

and Miss Harrel, "Tennessee Sky Harbor," incidentally, a new airport about 30 miles from Nashville, is operated by Interstate Airlines, Inc., and was being dedicated the day of the Tour's stop. Post a Lockheed covered the morning leg in 1 hr. 19 min. 43 sec., the best time of any of the contestants. Steve Lacy's Cessna was second best, with 1 hr. 23 min. 27 sec., Stanley Scammon, third, 1 hr. 32 min. 04 sec.; Livingston, fourth, 1 hr. 34 min. 09 sec., and Holdeman, fifth, 1 hr. 35 min. 04 sec.

Headwinds over the 246-mile stretch into Cincinnati were responsible for the ineffectual losses for the last leg registered by Meyer, Lancaster, Wadlow and Moffatt. Over this course the pilots were pointing their craft about 15 degrees east of due north, at a time when the winds had shifted from south to northeast. More than half of the terrain, too, was of such mountain nature that low flying was out of the question.

The Tour left its second entry in Cincinnati, this time one of the three women pilots, all of whom, incidentally, had been given a good account of themselves throughout the itinerary. According to the story and by Miss Harrel, the servicemen's one, she flew over the finish line on London Airport engineering in, then climbed the field, throttled her engine and placed it in land. When only a few feet off the ground, she said another plane, not one of the Tour's group, landing downwind put in her way. Opening her throttle she pulled up, attempting to go around and come in again. Instead, she stalled, landing only about 30 ft. from where "Pop" Cleveland, Art Schlicher, and a group of fans were standing, and turned over. The little Gipsy Moth was swished beyond the possibility of repair in time to finish the Tour. Miss Harrel escaped with a fractured nose and a badly bruised right eye. She continued the Tour as a passenger in the Carlin's Cessna. The wooden left 37 of the 38 starters still competing for the Elmer Ford trophy.

Despite the disaster of the Marlborough-Cincinnati leg, the headwinds, and the subsequent difficulties that are encountered in mountain travel, some splendid elapsed times were turned in. Wiley Post registering the distance in 1 hr. 39 min. 10 sec.; Steve Lacy, in 1 hr. 41 min. 08 sec.; Stanley Scammon, in 1 hr. 43 min. 16 sec.; Bob Knight in 1 hr. 48 min. 39 sec., and Johnny Livingston is 1 hr. 50 min. 29 sec.

An amusing story is told about Post's second time to Cincinnati. As was the case, Lee Schoenbach, carrying Art Schlicher and E. P. Coaker, occurs, in his Lockheed, usually took off about an hour before the competing planes in order to arrive at a control point at a place of time to permit the starters to help take the contestants in. From Marlborough, however, Schoenbach and Hawks

chines caught alive and were turned badly before the fire was checked at the road. The road, incidentally, seemed to be about all that saved the Air Tour planes from total destruction.

WHEN THE scores were checked in St. Paul, it was found that only two of the entries, the Moth flown by Krigsh, and the Curtiss Condor, were late into their final point. The Condor had been forced to land near Parkhurst, Minn., with engine difficulties. At 5 p.m. the Tour's largest crowd landed in St. Paul, where it was decided to continue the remaining miles of the route across several of its passengers. Carrying only the two pilots, J. W. Cresswell and Karl E. Voelker, and two passengers, Adam Long, and Miss Frances Harrell (the rest of the contest had been made up by a relay race) the Condor took off with the rest the following day.

Weather conditions on the day of the departure from St. Paul evolt the Tour the worst blow, from a reliable standpoint, the event has even been known to suffer. The planes left St. Paul with brains moderately high (the wind was blowing from the north) and the flying quickly deteriorated, becoming low enough over the "hazy" at Chippewa Lake to "lose it" on high points of the terrain. Approximately a dozen of the craft, divided equally between the competing and the accompanying planes, encountered the low cloud bank at Chippewa Lake, and were forced to land, although only a few miles outward the ceiling increased to the elevation demanded. About 80 miles west of Wausau, 173 miles from St. Paul, the scheduled lunch stop, breaks in the overcast appeared, encouraging considerably toward Wausau.

So many of the landing planes were "out down" in a certain case, planes near Chippewa Falls, that Chippewa Falls should be on the records as one of the official Air Tour stops. Among those who reportedly paid this charming Wisconsin city an unexpected visit were: John Livingston, Art Krigsh, Perry Whelan, Frank Halloway, Fred Halloway, and Robert W. Cleveland. Others, including Steve Lacey, Stanley Stenoth, Nicholson, and Howard Alby, joining a non-competing Wausau detachment, went down before the fog at other points along the route.

Because of tail-wind some of those who "set down" were enabled to resume their journey and arrive in Wausau within scheduled time. However, Cresswell, Lancaster, Krigsh, Wellborn, McGredy, and Lacey were late into the home of last year's Tour winner. The 160-mile trip from Wausau to Milwaukee, the night stop, was made under a ceiling of 5,000 ft., with light side winds from the west-southwest. Only two of the contestants, Wellborn and McGredy, received imperfect scores for the afternoon leg.

Rain and low clouds prevailed in Milwaukee Saturday night and early Sunday morning, but these did not deter the flyers and the planes left Milwaukee bound for Mohawk, Ill., 174 miles distant, under an overcast sky. A low ceiling lifted gradually toward the west, and when Mohawk was reached the sky was clear of all clouds, although 2,000 ft. A light headwind from the southwest, increasing with altitude, was the probable cause of five contestants, Lancaster, Wellborn, Young, Shelton and Miller, being late into Mohawk. At 2 p.m. the Tour planes about land and began the 149-mile flight back east to Chicago, the last overnight stop of the long Tour route. Two of the pilots, Rogers and Lacey, were late arriving in the "Windy City." The latter

being forced down on route with a blown cylinder. Shortly after his unscheduled landing Lacey took off again and flew into Chicago on eight cylinders. He arrived on the Curtiss-Rogers field just too late to ship Wright service plane, piloted by Mr. Chapman, from gang back to start him. The Wright plane, incidentally, became stuck landed near where Lacey had landed and was compelled to remain there overnight.

Although this and the writer's preceding Air Tour have been dealt only with the progress of the Tour, and have made no attempt to describe any of the 12 airports the planes landed upon, it seems that special mention should be made of the Curtiss company's Glenview field in Chicago. Without taking into consideration its distance from the loop district, this airport was, in the writer's mind, the finest visited by the 1928 Tour. The municipal airport at Wichita came in as a close second.

On Monday, the final day of the Tour, the impossible flying conditions that had threatened the plane since their visit to Cedar Rapids, appeared less of a few hours off. A low ceiling of 1,62 miles in Kalamazoo and the final one of 120 miles into Ford Airport were all that remained of the 5,000-mile track. Broken clouds at about 1,000 ft. over Glenview became overcast at about 1,200 ft. over the southern edge of Lake Michigan, this condition continuing toward Kalamazoo. About 80 miles west of Kalamazoo the low clouds broke, and the conditions improved. The start of the competing planes from Chicago was actually delayed for about an hour until it was ascertained that this condition was not becoming worse.

The delays between Chicago and Kalamazoo was measured around Lake Michigan, although the pilots were in liberty to fly directly across the lake if they chose to do so. If any of the contestants did take the short cut, the writer never learned about it. Five of the contestants were late into Kalamazoo, these being Miss Miller, Miss Halloway, Wellborn, McGredy and Myers.

A low ceiling and falling clouds were reported visibility at Detroit, and even worse conditions midway, required action in releasing the planes for the final hop. A check on conditions about 30 miles, coupled with reports that wind and advance planes had pushed through, indicated that a start at 8 p.m. (one hour later than the usual starting time) would be a last chance to squeeze through to the Tour's end. Mr. Anderson, the Tour's highly efficient weather expert, notified the pilots that conditions appeared to be slowly getting worse. He warned them of rain, low ceiling and light winds, but that there would be no violent storm. The only wind was from the north and it was of moderate velocity.

Actual delays were verified to the letter. But, with the exception of Captain Lancaster, mentioned in the first paragraph of this article, all of the competing and accompanying pilots brought their charges through to Ford Airport. With President Hoover, Thomas A. Edison, and a host of notables either on or near the airport, this last leg, it seemed to the writer, was a magnificent and concluding argument in favor of the reliability of airports. Five of the pilots, however, Moore, McGredy, Krigsh, Young, and Wellborn, were charged with inferior scores on the final leg.

Shortly after the last Tour plane had landed on the Southern airport, the rain and haze increased and the ceiling became dangerously low, breaching the advance flight of a tropical storm centered over Alabama and Tennessee.

THE ROAD BUILDERS CONSIDER *Municipal Airports*

By CHARLES H. GALE
Assistant Editor of *Aeronautics*

THE REALIZATION that there is as much, if not more, of importance in the ground department of flying as there is in the more spectacular department of flight itself has been increasing rapidly in recent years. It is the most vital item of this important ground department in the airport. It has been and probably always will be the greatest single factor in the progress of airport flying, such as is represented by regular air transport. Certain it is that it represents the greatest single factor in the matter of proper ground equipment.

Speaking broadly, then, there cannot be too much attention to airport matters or too many meetings of those interested in that institution and efforts to pool their experience, troubles and criticisms. There have been many airport conferences in recent months, but they are needed at this stage of the game. They are desirable, particularly when they serve to focus the attention of a new group of persons upon airport matters. And when that group comprises experts in matters closely allied to the complex problems of airports, the event is especially noteworthy.

Just this has happened at the Municipal Airport Conference held Oct. 26-27 at the Willard Hotel, Washington, D. C., under the auspices of the City Officials Division of the American Road Builders' Association and sponsored by the Aeronautical Chamber of Commerce. As those dealing with airports today know full well, the two most absorbing questions involved are those of drainage and surfacing. This conference brought together men who have been living drainage and surfacing for years and who they know about these things in relation to highway building is almost as much as anyone knows right now about airport ground preparation.

After listening to the discussions in two days of technical sessions dealing with major airport problems, one could not help but feel in a very congratulatory mood toward those responsible for promoting the conference. Its purpose was to inform the highway experts of our American cities of the various aspects of the airport game and to stimulate them to share their interest and experience in their local airport projects. Those who have been in airport construction work here have seen to borrowing the road builders' tools, since they are the machines used for the work, and now it is proposed to apply the road builder himself.

While most of the papers were given by men long associated with the aeronautical industry, two of the

most valuable were delivered by men primarily interested in highway construction. Their contributions served to indicate the great service their profession may perform in the country's airport development program. Reference is made to the paper on drainage and the paper on surfacing, to be discussed later in this article. About 250 attended the conference and about 200 of these were highway construction men representing practically the entire country. The balance were for the most part airport construction men, airport managers, and others devoting their entire time to the aeronautical industry.

Summarizing the general impressions one derived, it was apparent that there is an ever more marked trend toward national concerns, principally for take-off purposes, than was represented at one or several a conference as the spring at Cleveland last May, there is a definite trend toward modern airport building construction and a growing realization of the importance of airport buildings; there was a frank realization of the shortcomings still existing. Naturally the emphasis at this conference was on municipal airports, since it was held for the benefit of city officials, but commercial ports must benefit because of the similarity of problems.

"The airport development program in this country has been terrible," declared Hon. David S. Reppels, assistant secretary of the House for aeronautics, in the course of the main session of the last session, preceding the first technical session, which started at 8 p.m. Thursday afternoon. Airports constitute the most essential department in aviation at the present time, he went on to say, and he lauded the attention which the American Road Builders' Association was giving to the problem through the medium of this conference.

Cos. H. H. Bueas, chief of the Airports and Industrial Section of the Aeronautics Branch, presided at all three of the technical sessions. It introducing R. Russell Shaw, St. Louis airport engineer and first speaker at the opening technical session, he called attention to the fact that about 1,200 communities are making plans at various stages of maturity to construct airports while about 1,400 are in the process of constructing such facilities. This indicates that the comparative airport in this country has passed, he said, and only expert treatment of the airport will suffice.

Mr. Shaw took advantage of the fact that the conference comprised many city officials to remind those gathered in the room how airport projects have tended to be

rather than merely tested merely as political footballs.

He discussed "Airport Planning" according to the ten aspects of the selection, layout, design and grading, drainage, surfacing, lighting, fire protection, landscaping, communications and possible revenue to be derived. While a group of men engaged in problems of road building would naturally feel quite at home in the sort of activity covered by these topics, nevertheless the conference was reminded that the situation is not as simple as it looks on the surface and that a wide variety of considerations peculiar to aviation must enter into such these departments of an airport project.

For instance, in airport planning it is important to determine the feasibility of the proposed airport—whether it is to be primarily military or commercial and, if the latter, whether it is to handle military, school, governmental, general commercial operations, or special activities. These factors influence the nature and arrangement of the buildings on the airport as well as the size and type of terrain to be chosen on which to locate the port. Light traveling planes, for example, require a much less elaborately prepared surface than would the heavier transport types.

Utilization of large flat roof areas for city building funds is not regarded possible by the speaker. Matters of economy and safety are always bound to be in the background, such as a structure, the hazard of wind uplift and common sense are involved considered to his lack of faith in this type of airport. As for size, it was stated that a building providing a roof with 3000 ft. square is all that would be of permanent duration. In the discussion which followed, emphasis again was given to the desirability of including airport projects within the general city plan and the fact that in all airport projects the advance evaluation of the economic aspects should not be forgotten. That is, economic conditions in wind and may be assured only by study of revenue sources and volume of use by public and aviation concerns.

Problems for better airport buildings, both structurally and architecturally, and for the adoption of such airport as a general plan of design and arrangement were the burden of the paper by Kenneth Traubman, architect of the Curtis Airport Corporation. He rather started the conference by declaring that there are today almost no airport buildings in this country which will be useful in five years time. "With costly few exceptions we have no really permanent structures," he declared. A more encouraging outlook was presented, however, by a later statement, that many buildings now under construction represent considerable advance over those of one month ago in regard to permanence, design and construction.

It still is impossible, he said, to secure approval of a design of a building that is even fairly conformable to buildings which have been constructed and are now under construction at Maryland airports. Much of this opposition is due to owners who fear tenants will not pay sufficient rent to justify the best sort of buildings. But here again a trend is noted toward appreciation by owners and tenants of the value of improved structures.

Strong exceptions were taken to Mr. Traubman's statement in the discussion following the reading of the paper, by Maj. John Berry, of the Cleveland Airport. He declared that permanency of construction already characterized such Mid-West and Western airport buildings, the Cleveland Airport being a case in point.

In reply it was pointed out by other commentators, as well as Mr. Traubman, that the speaker sought a definite, general architectural scheme for the airport development in addition to a permanent type of construction. Another trend is toward the provision of separate buildings at an airport for certain types of work and the grouping of buildings housing allied activities. Mr. Traubman reported. The use of the house or wing for overhead and repair work is losing favor at the larger airports and a separate building devoted entirely to this sort of work is replacing it. Included in this tendency is the motor garage building, which replaces the old engine test blocks, and the shops and paint shop.

A request for information regarding methods of leasing hangars at municipal airports brought out the fact that at Buffalo the hangars are erected by the city and leased on the basis of 10 per cent of the larger cost. In the case of the small hangars whose space is leased to individuals, the city looks after the operation of the hangar. In the case of the larger hangars, they are rented to the larger operators who are charged with the administration of the hangar, lighting, heat, and water from the city. Maintenance cost of airport roads and lawns, etc., is apportioned among the tenants.

At Cleveland the city has built only the administration building. All the other buildings have been erected on ground leased in units of 250 sq. ft. at the rate of \$3-00 per unit. Hangars must have a rent of not less than 110 ft. As for the future, Mr. Traubman is opposed to city built or operated buildings other than an administration building and an airport hotel. Hangars may be erected on ground leased for 25 years at the rate of not less than \$2-50 per square foot. Modernistic architecture is stipulated and built break must be used. The common span of the hangars in Zone A (the principal operating area at Akron) has been set at 300 ft.

That road structures reached more familiar ground when a paper devoted entirely to airport drainage was read by R. C. Hogebecker, senior highway engineer of the Bureau of Public Roads. This was easily the most substantial and most interesting of the subjects treated in the first afternoon session. Highway engineers have been facing drainage puzzles for years and it was evident that one of their most valuable contributions to airports lay in this field.

While a great deal is known about drainage, even Mr. Hogebecker, in cooperation with other experts present, substantially admitted that "mystic" in the correct definition of any number of aspects of the drainage engineering. This matter of drainage by the way, falls into two distinct departments, natural drainage and artificial drainage.

Every effort should be made, of course, to select a site which by virtue of a slightly porous soil and the presence of a slight slope, would not require the installation of an artificial system. The soil must be somewhat more often than not be of such a nature that the soil demands some artificial arrangement to keep them in shape for continued use. In this case the first thing to do is to make a thorough examination of the site to discover the ground water elevation, and the arrangement, thickness and permeability of the water carrying strata and profile. A thorough knowledge of performance of water on and in the soil is essential.

Artificial drainage may be required to remove surface water, seepage water, or, depending on the local climate, reduce the extent of freezing due to frost. To



Left, Col. W. Center of the Royal Dutch-Motors Association, whose company is now in the process of being reorganized to handle commercial aviation; in the center, Mr. Hogebecker, senior highway engineer of the Bureau of Public Roads, architect of the Curtis Airport Corporation; right, Kenneth Traubman, architect of the Curtis Airport Corporation, whose paper advocated greater permanency in airport buildings.

take care of surface water, drains should be placed along the edge of runways (where runways have been installed), or at intervals determined by local soil and water conditions over the entire landing area (where runways are absent). Drains in runway aprons should be placed along the edge of runways also, and in some extreme cases under the runways. Where no runways are used the spacing of seepage drains represents another of the puzzles involved in drainage engineering, each individual airport site requiring special treatment.

The main factors of drainage installation are: depth drains is to be placed under ground, use of the drainage type, and construction. As for depth, it is the general rule to place the drains low enough to meet the average water level. Where there is no important natural, it is the rule to extend the drains to a depth of about 3 ft. in clay and 5 ft. in silt, where freezing does not occur. Otherwise the drains should extend to a depth equal to at least the depth of frost penetration.

The size of the drains depends, of course, on such considerations as the local use of rainfall, size of area to be drained, volume of surface water runoff, and time allowed for removal of water, according to Mr. Hogebecker. Various formulas have been evolved to simplify the calculation of drain size. Type of drain is governed by the nature of the airport itself. The drains must be able to withstand the landing loads of the aircraft which will be using the field. This involves the relative merits of metal, tile and concrete installations.

As for drain construction, it seems to be the rule, according to the speaker, to place permanent metal culverts with inlets downward upon a porous base, while tile or concrete drains may be laid either on a specially prepared base or directly on a trench bottom. Engineers seem to agree that trenches containing drains should have a back-fill of porous material. The use of materials to support and repair the drainage system was recommended.

The paper suggested that air in the soil must be taken into consideration at all times for water raised into and away from the air excepted. An artificial drain serves

as an increase of escape for this air so that the things may happen, the water is permitted to enter the ground and the water below the surface is able to flow into the drain and be elevated.

From follows another of the puzzles about which very little in the nature of general rules may be developed. In sandy and sand and even in silty soils, where conditions do not encourage or encourage, there must be a great concern about frost action. Permeable soils and similar soil composition often encourage the action and because of their tendency to develop serious frost conditions, a remedy must be applied. The speaker recommended that drains be placed longitudinally along the center of the runways, in their cases, and deep enough to coincide with the maximum frost depth.

In making a few very general recommendations for draining several types of landing fields, Mr. Hogebecker stated that drains may be spaced up to about 300 ft. or more apart on a field consisting of dense material while the spacing would have to be much closer on the same field if it happened to have a plowed or rough surface with a low water factor. Another type mentioned was a field having a top surface of three or four feet of silt underlain by a dense, impermeable clay. The drains should not be more than 30 or 35 ft. apart in this case. As for a soft silt or silt, the speaker recommended placing a layer of good material above it rather than trying to drain it.

THE FOUR SPEAKERS at the banquet Thursday night in the ballroom of the Wilford Hotel were Senator Bruce B. Bessie, president of the N.A.A.; Maj. Gen. John P. O'Rourke, president of the National Airports System; Hon. F. T. Dwyer, assistant secretary of war for aeronautics; and Maj. W. Irving Greer, assistant postmaster general in charge of the air mail.

The Airways is expected by Senator Bessie to have considerable influence on the future airport. These measures may serve as ferry planes between downtown airports and analyzing laws and agreements in the present problems now are on the ground at this time. It is giving engineers like the road builders a great opportunity to contribute to the advancement of the industry. Senator Bessie took occasion to voice his opposition to the idea of placing control of airports under the Interstate Commerce Commission. He based this defense on the conviction that the two methods of transportation that is, trains and airplanes, are fundamentally as wide apart as the poles and the same board could not intelligently deal with both.

General O'Rourke described the commercial field of aviation and Secretary Dwyer welcomed Senator Bessie's conviction about the future of the Airports type. The latter also described the recent successful flight of the Wrights of Dayton, James Doolittle. Mr. Greer declared that the government is still absolutely sold on the idea of air mail in spite of opposition to the contrary which have been directed lately following the recent air mail hearings. He urged the removal of airports from airlines and expressed extreme dissatisfaction with the general airport facilities for air mail planes in the city of Washington.

An indication of the very valuable work which the road builders may contribute to the matter of airport construction was contained in the paper read at the Friday morning session on airport surfacing. This was given by C. N. Connor, engineer in charge of the Road Builders' Association. It contained a great deal of information

based, practically exclusively, on some, on 10 years of experience with road building problems. Yet they were applicable to the airport situation as well.

Problems of impact of a vehicle upon a surface and the general wear and tear of such surfaces, which are old stories with Mr. Cowan and his profession. Much more study is needed for up-to-date understanding of the impact loads delivered by landing aircraft, he said, but it is evident that the roadbuilders would start in on such research with a great advantage over the average engineer.

He classified airport surfaces under four divisions: Group 1—graded and drained earth, which includes earth and soil; group 2—low types, which include selected soils, clay, gravel and sand stone, clay and concrete, paving; 3, intermediate types, which include bituminous surfaces of various types laid on a prepared subgrade or base course other than a Portland Cement concrete base; group 4—the high types, which are surfaces composed of Portland Cement or are laid on a Portland Cement concrete base.

Group 1 has advantages such as low first cost, good drainage, good base for future surfaces and good visual friction, but has the disadvantage of high maintenance cost, poor visibility from the air, poor loadings and poor surfaces, necessitating to add skills, etc. Group 2 has the advantage of low first cost, good drainage, good wheel loading and good base for future surfaces, while it has the disadvantage of high maintenance cost, poor background for markings change by alkali dust. Group 3 includes four types: surface treatment, porous, Macadam, second-in-place and the precast. There offer the advantages of fairly low initial and maintenance cost, except for the surface type which has a high maintenance cost, and the precast type which has a high first cost, installation and maintenance, good drainage, surface and fairly long life, except for the first, or surface treatment type. The last three types have the disadvantages of requiring expert maintenance. Group 4 offers a low maintenance cost, good visibility, long life, elimination of dust and dirt, and is strong and durable. Its disadvantages are need for skill in design and fairly high first cost.

His conclusions were: (1) Research is needed for determining the besting factor required to carry aircraft. Present data are not adequate. (2) Surfaces of earth and soil are inadequate for heavy planes. (3) Airport surfaces may be constructed by the stage and progressive method or by the immediate method with a high type pavement. (4) Traffic surveys and intelligent planning are necessary before determining the method of construction and type of surface. (5) Construction and maintenance methods for airport surfacing are the same as for highway surfacing. (6) In general the high types of surfacing cost the most for initial construction. (7) The high types of surfacing cost less for maintenance than the low types and intermediate types. (8) Strong indications are that airport surfaces when of the same type as highway surfaces should cost less than highway surfaces, because they may be thinner and because construction conditions are more easily controlled. (9) Highway engineers, highway contractors and highway equipment manufacturers are the best qualified group for constructing and maintaining airport surfaces.

The question was asked in the discussion period as to the effect of alkali dusts delivered for airport surfaces as the initial phase of aircraft operating thereon.

It was reported that at Akron a quantity of the fuel was used on an airport parking area and that Dr. Amundson of the Goodrich-Zepher Corporation requested that no more of this be used where there would be any likelihood of its coming in contact with aircraft. It seems that exhaustive tests had been made by the shiping people in which it was found that not only does the composition have a bad effect on light alloys, but an action is of an insidious nature, being at times noticeable in casual observation.

A. Poulton Thaler, Jr., chief of the field service section of the Aeromarine Division was the second speaker of the morning session. His discussion of airport management was confined principally to the municipal airport rather than the commercial airports. Although it is true that the two have many common problems. Good management is essential, he pointed out, to safety and pure efficiency. The latter applies not only to the field operations but also to the business status of the institution.

Control of all aerial traffic and ground traffic needs development, he explained, because it is inevitable that the great investment of land, buildings, planes and equipment represented in a large airport shall rest on the movement of one plane at a time, as it is all too often the present situation.

In his paper on Airport Progress, M. R. Duffy, manager of the Buffalo airport, presented his idea of what every modern airport should have. Among the salient points brought out were the present need of such institutions as the control tower, airport hotel, attractive administration building, a person to greet each incoming plane, parallel runways (one for landing and one for taking off), concentration of structures, such as hangars, control eating plant, and other buildings.

Mr. Duffy mentioned that the Stader and Ford hotel between the Buffalo are serving landing airports with an eye to the inauguration of an airport hotel chain. Adequate fire protection was emphasized and in this connection he mentioned the Buffalo plan for a Pomona pump rigged with a derrick and chain for the best handling of the fire in which it is necessary to answer the burning machine for rescue or other purposes.

Discussion airport and public parks, Lieut.-Col. U. S. Grosvenor, chief of public buildings and parks in the District of Columbia, made the point that experienced park commissions capable of handling airport projects already exist in most cities. Thus the establishment of a new special agency for airport administration would be unnecessary consequences, he contended, and the placing of the airport or airport site under a park board would insure its permanent retention for that purpose.

The final paper of the technical session was read by Maj. Clarence M. Young, assistant secretary of commerce for aeronautics. He described in great detail his recent flying tour of a number of important European air centers. Particularly impressive to him was the completeness of the administrative systems and equipment at such airports as Croydon, Le Bourget and Tempelhof, and the extreme care taken of the comfort of the public. The three houses which this country might apply, he said, were: (1) Adequate facilities with a qualified executive in charge; (2) definite method of all activities, including their segregation when possible and schedule; and (3) uniform rules and regulations governing the operation of every phase of the variety of the airport, and in landing and taking-off.

FACTORY COOPERATION

Boosts

DISTRIBUTOR SALES

By DOUGLAS W. CLEPHANE
Ryan Aircraft Corporation

WITH the period of intense competition for airplane sales just beginning, sales policies are largely in the formative stage and there are many vital problems related to the sales organizations that have yet to be worked out.

The Ryan Aircraft Corporation, makers of the popular Ryan Beechcraft single-engine ship, has developed one of the oldest and most effective organizations in the industry, and some of the policies which have developed this organization may be of interest to the industry.

Starting with the strict policy of closed territory and a distributor-dealer organization, each dealer and distributor is fully protected on all sales made in his territory, regardless of his reference in making the sale. The development of this organization dates back three years, during a period when purchasers were fighting for delivery of every new car in excess of the production line. The Ryan organization saw that this period was bound to come to an abrupt end and that a national and world-wide system of distribution would be necessary. Thus many thousands of dealers in unnecessary commissions were paid during the last three years, but this policy has resulted in a loyal and an aggressive sales organization long back up.

The first principle upon which the organization has been built is that of giving every possible help to dealers and distributors. The third policy is a strict selection of new dealers and distributors, and the elimination of those that have not made successful sales efforts at the expiration of their contracts. And finally, the fair treatment of all holders of sales franchises.

There are two secondary contradictory features of sales in the airline phase plane. First, that when many organizations and individuals are ready for a place, they come to the distributor with little effort on his part, and his sales

problems is to get delivery on the specified date. Second, that there is a very market for planes is less than that required for many airplane sales efforts to reach those the sale of any other product.

However, the dealer makes many sales without a great deal of effort. It is not at all unusual for a man, whom the distributor never heard of, to walk into his office and say "Here's my check for a Ryan. When can I get delivery?"

The Ryan organization has always believed that it is essential and fair that the distributor should receive full commission on these sales as well as those made by the factory, which will be discussed later, in order that he may be justified in making an aggressive effort to cover his territory thoroughly and gradually create the many potential prospects to the point where a sale will result.

Thus, each distributor has a well defined territory, usually a state or part of a state, and in some parts of the South and West, a larger territory.

To obtain an exclusive territorial franchise, each distributor must fulfill the following main qualifications:

- (1) Contract for a certain number of planes per year, depending on the size of his territory and number of potential prospects in that territory.
- (2) Buy a demonstrator, and always keep it available for demonstration.

(3) Have at least one man devoting practically his whole time to airplane sales.

(4) Place a deposit on taking the contract to insure fulfillment of all conditions.

It is important to note, however, that the dealer who does not intend to make a serious effort, and the occasional commercial operating company that would obtain a contract to get planes needed for occasional operation at a discount.



B. S. Adams, Vice-President of Ryan Aircraft Corporation

While these requirements are somewhat more rigid than many manufacturers see desirable, they are necessary to sustain the factory in carrying out its intensive system of sales helps, and in terms for the map sales that come without any sales effort, it is only fair that the distributor make an intensive effort to cover his entire territory completely.

Very few companies ever cover an entire state effectively even in the expensive plane class, and as each distributor is made responsible for developing all the sales territory should show he usually appoints dealers in all large centers more than his own office. These dealers work on many different assignments. The majority of them do not maintain demonstrating places, and do not contract for a definite number of planes, and do not have full time airplane salesmen. Their commissions are entirely variable since the distributor who refers his sales representative for a state. Their value lies in their knowledge of local conditions and the transportation routes, habits and financial ability of all individuals and corporations in their territory. They coach their territory for prospects and look up individuals and corporations who have made inquiries at the factory or through the distributor, arranging for demonstration by the distributor where it is believed to be worth while. In practically every case the distributor actually closes the sale, but the dealer's part is to find a potential prospect and convince him in the value of air transportation for business or sport. It is then up to the distributor to sell him the type of plane best suited to his needs.

These dealers are usually commercial operators of schools, air transport lines, and taxi services although some and some automobile dealers are entering the field. Other types of organizations have made some success with dealer contracts.

American practically all of the distributors have men who devote their full time to developing sales in the Ryan, a highly specialized organization is required to make sales to the large business enterprises which are just beginning to realize the value of owning planes. It is usual then, in developing these sales the distributor has sales representatives with a pilot and a demonstrating plane covering every section of the country. The Ryan organization has realized that the ideal combination of an expert pilot plane pilot and a salesman who is capable of approaching presidents of large corporations, commercial operators and other prospects is seldom found. Therefore, pilots with over 2000 hours are employed to pilot the factory demonstrator, and a salesman who is also a pilot and has years of experience in sales methods accompanies him.

The factory sales team with its latest model plane makes periodic visits to all distributors and dealers, approaching all prospects whom the distributors believe can use a plane, but for some reason have held off buying.

Thus bring to the attention of the distributor methods which other distributors have found to bring exceptional results in the sales field, help him with the preparation of direct mail literature and the selection of incentives and pilots, and generally assist him in applying knowledge of modern airplane sales methods.

Each dealer with the help of the factory makes up a complete list of all individuals in his territory having an income sufficient to warrant the purchase of a plane. Another list of all corporations whose business is of such a nature that they would use their own plane profitably is made up. This list is then gone over by the distributor's local dealer, and the names of all corporations

and individuals whom it is known would not purchase a plane are struck off. The remainder are then approached personally by a systematic campaign.

Sometimes these prospects are worked on for a period of years before a sale results. In many cases these follow-up visits and demonstrations are made by the factory representative. In addition, the factory carries on a systematic correspondence with all of these prospects and the distributor is kept informed of the results.

Literature outlining the experience of a particular class of all companies owning airplanes is prepared and sent by mail to all corporations in this field. For example, several of companies now own Ryan, and the experience of these companies has been compiled together with figures on cost of operation and savings. A general outline of just how all companies can use an airplane to advantage is sent to all companies in the field. Other classes of business such as newspapers and large sales organizations are recorded in the same fashion and literature outlining a definite plan of airplane use is sent to potential prospects. This literature, describing the advantages of airplane ownership, is so complete enough to get to the desks of presidents of the largest corporations, and as high as a 65 per cent response has been obtained from some of these mailings. Prospects thus obtained are passed over to the distributors. The factory sales representative makes a check of all prospects on his visits to insure that the distributor is covering his territory effectively.

In addition a publicity department is maintained which seeks articles and news stories in all the large newspapers in the country, and to some 50 magazines and other publications which publish aviation material. Newspapers and magazines are just beginning to realize that there is more news in aviation than the details of a crash, and the more progressive newspapers and magazines are only too glad to have good news material.

To enable intensive working of the territory as outlined, the distributors are in many cases operating their own territory. It has been found that a small territory closely worked will bring more results than an attempt to cover a large sector.

The distributors have learned that it is necessary to make more than a 15 minute demonstration to sell the type of prospect that would buy a Ryan. Many of them make a practice of placing their demonstrating plane and a pilot at the disposal of a prospect for several days, taking him on an extended business trip, showing him the performance of the plane, the flexibility of landing fields, and the time that can be saved under the actual conditions that the prospect would use a plane.

The Ryan representative has realized that the distributors and dealers must make money before the factory can do so, and the telephone system is designed to add them in every possible way. The distributor gets full credit on all sales made in his territory by the factory or the factory sales representative. Allowance is often made for unusual conditions which prevent the fulfillment of the conditions of the contract, and in every case the distributor is given the benefit of any doubt. It is a poor sales organization that cannot make money under these conditions, and it may be said that every Ryan distributor last year showed a substantial profit on sales. In a way of all this statement there is a place for every organization that wants to enter the airplane sales field, regardless of whether or not it can make the investment in a demonstrator plane required of distributors.

THE AIR-RAIL STATION AT Port Columbus

*An Up-To-The-Minute Airport With Special Accommodations
for TAT Passengers*

By WALTER E. BURNETT

"WHERE Plane and Train Meet." So reads the official itinerary of Columbus, capital city of Ohio, now that Port Columbus, the new commercial flying field containing the fine aerial passenger station in the country, is nearing completion. Port Columbus is the eastern air terminus of the Transcontinental Air Transport system which operates in conjunction with the Pennsylvania railroad in carrying passengers between New York and Los Angeles. (Its operation was described in detail in the July 6 issue of *Aviation*.)

Dedication of Port Columbus, on July 6, found three building units completed, runways aprons and other paving in, lighting equipment ready, and much of the painting done. At the same time, construction work on several new hangars is well under way.

Doubtless the most interesting feature of the airport is the depot in which the rail passenger becomes an air

traveler within a few minutes. On the southern edge of the field are tracks of the Pennsylvania and Baltimore & Ohio railroads. Along these, two 600-ft concrete platforms, surrounded for most of the length by passenger train sheds, have been built. The sheds consist of roof supports supporting a roof which protects passengers and baggage from rain and snow.

After alighting from the train, the passenger walks through a covered passageway into the administration building and passenger depot, a short distance away. This covered walk is a temporary feature, and later will be replaced by an underground tunnel to permit a highway to be run between the train sheds and depot.

Upon arriving at the depot building, the passenger has his baggage checked, and proceeds to obtain his ticket. It is a Department of Commerce ruling that the weight of passenger and baggage must be stated before entering



The first TAT building at Port Columbus showing present roof and concrete aprons in front of the baggage area.

on airplane. So, as the traveler steps upon a slightly elevated stage—only a scale platform—his weight and that of his baggage are automatically recorded, without his knowing it.

The ticket obtained, the air-mail voyager proceeds through another covered walk directly to the door of the Ford 16-passenger transport that is to carry him westward. A telescoping screen permits the walkway canopy to be extended to the side of the cabin, so that canvas persons will not be tempted to make a personal inspection of the craft, moving the passengers, getting in the way of mechanics, and the like. After passengers and baggage are aboard the engines are started, the plane taxied over the asphalt-paved apron to the head of one of the runways ready for the take-off.

THE ADMINISTRATIVE BUILDING, hangars, and all other structures on the field are of concrete and brick construction. Built colored bricks with black seaming and slate trim openings form a pleasing combination.

The passenger passenger depot and administration building has a foundation size of 36x100 ft. and is two stories high. At the northeast corner is an octagonal tower whose greatest diameter is 20 ft. This is glass-enclosed, so that a clear view of all parts of the field is provided. The tower houses the airport weather bureau and the lighting control switchboard. An operator can turn on an emergency ray light on the field merely by moving a lever.

On the first floor, there is a lounge room for travelers, general passenger waiting room, dining room, ladies' room, baggage room and, on the outside, an awning-covered terrace from which guests may watch the operation of planes.

The second floor is given over partly to a series of offices for various departments of the field. There is also a room for the Department of Commerce representatives who constantly visit the field, a telephone room, men's place lounge and showers, and lounge, showers and dressing rooms for women pilots.

The office that has been provided for Department of Commerce use is a somewhat unusual feature. An inspector from the department frequently finds that, on visiting an airport, he has no place where he can take care of correspondence and other clerical work. Builders of Port Columbus have noted this condition, and have

accordingly fitted out a complete office that is at the disposal of department representatives exclusively.

The present administration building is but a portion of that which eventually will be required. The first annex will be built at the western end so that the original tower will be in the center of the structure, on the field side. There is ample space for other additions south of the present building.

Five hundred feet north and slightly east of the administration building is the first of a series of main hangars. It is one of two that serve as Transcontinental Air Transport operating headquarters.

The TAT hangar is 107 ft. 5 in. wide and 206 ft. long. Door openings are 130x32 ft. in dimension. A recessed floor running for about half the length of the structure provides storage space, and a series of rooms on one side give additional space for storage and other purposes. Offices of TAT are in the administration building.

Each of the main hangar sites in this area is 225x300 ft. and restrictions as to size and type of hangar are enforced. Lots are leased by the city to operating companies for \$1,000 a year. Two have been taken by TAT. Upon mother, a Curtiss Flying Service hangar is being built. A municipal hangar 125x110 ft. and costing about \$100,000 is being put up on another lot. United States Air Lines of Cleveland has leased a site. Universal Air Lines and Western Air Express are negotiating for two lots each. That will dispose of all available space in that section. There are 12 other and slightly larger sites on the north side of the field. These will be used as reserve lots.

Port Columbus boasts hangars that represent the best work in hanging field practice. A prevailing-wind runway 3,500-ft. long and 100-ft. wide extends northwest-southeast. A 2,500-ft. wing of the same width runs at nearly right angles to that. The prevailing-wind strip can be used for landing and taking off approximately eight months of the year.

Runways are connected by a 30-ft. paved taxi strip running the length of the hangar area, and a 120-ft.

Administration building and other passenger facilities with observation and control tower at top right.



concrete apron in front of each lot increases the paved area in front of the hangars to 180 ft. Runways and taxi strips are of five inch concrete covered with a 1.5-in. asphalt binder top. In all, there are 96,000 sq. ft. of paving.

Before any building or paving would be done, it was necessary to install a complete drainage system. The landing field area is drained by five-inch tiles made of vitrified shale. This material was found to be superior to the usual forms of drain tile. C. H. Stork, who helped to design the airport and has charge of the construction work, and others of the city engineering department, conducted exhaustive tests of tiles before making a selection. It was found that vitrified shale withstood up to 2,200 lb. on three-point inspection, while other types broke at about 800 or 900 lb. Further tests were made by burying vitrified shale in a trench which ranged in depth from one to three feet, and by subjecting the buried tile to the impact of a heavy motor truck dropped from a height of six inches, the drop being made by driving over a beam at the edge of the filled and tamped ditch. The tile was unharmed, even at the



Arriving at what speed before on the TAT hangar. This type of design, built with three lots, is specified for all hangars.

shadow and reflecting that it would hold up under normal impact of an airplane landing.

Outside of the runway area, rows of tile are spaced 60 ft. apart, with a minimum covering of two feet of dirt. On areas 350 ft. each side of the runways, spacing is 30 ft. In all, there are 165,000 ft. of drain tile in the field. A storm storm 6,000 ft. long, starting at 15 in. diameter and increasing to 48 in. to carry the water to Walnut creek.

To provide city water for airport use, a line two and one half miles long was laid. No sewerage extension was made. Instead, a complete sewage system, consisting of a number of underground treatment tanks, was installed.

Operators of the port are not neglecting any trouble from that which, at many flying fields, proves to be a chief nuisance. Sweeping will take care of the sand



Port Columbus radio station, located about 100 miles from the flying field.

area. The field proper will be covered with a turf of loam three inches. Sodding and seeding will cost \$25,000.

All buildings are floodlighted from the ground, these being on goose-neck brackets. A General Electric field flood beam of 24 kilowatts rating, using eight 300-watt lamps, has been installed. This unit develops 2,000,000 cp., and gives an average illumination over the field area of 15 foot candles.

On top of the control tower of the administration building are a Cresset-Fluorol revolving beacon of 6,000,000 cp. and two gram neon-neon lamps flashing in Morse code the letters "P.C.", meaning, obviously, "Port Columbus." The beacon is interesting. It has a cross-piece carries lens of heat-resistant clear glass, designed to direct 85 per cent of the light in a concentrated beam spread at an angle of 25 deg. A magnetic lamp-changer automatically levels and throws into focus a spare lamp upon failure of the first. The beacon sweeps through an arc of 180 deg. Its cycle is 30 sec., and the neon-neon lights flash their signal for five seconds, with an equal interval between. There is an illuminated red look and a "lighted" "T" for following pilots of ground air conditions.

A relief light is located on a steel tower 200 ft. from the ceiling indicator, which is mounted on the roof of the administration building. It consists of a metal arc graduated in feet and a variable light with pointer. Height of the ceiling is obtained by turning on the light and leveling the sight on the spot where the beam strikes the cloud layer. Height of this spot is read off directly in feet.

All hearing of hangarings at the airport is done by gy-fax. This dimension all makes except that which comes from an occasional train passing nearby.

PORT COLUMBUS is the outgrowth of a city-wide enterprise conducted about a year ago by residents who realized that local flying facilities were not adequate for possible future development. An \$850,000 bond issue for the building of a municipal airport was voted in November 1936, by a margin of almost five to one. An area of 640 acres on Fish Bend, east of the city, and not far from Warren Field, was purchased. The present development includes only 325 acres of this tract. Planning of the port began at once, and has been proceeding under the direction of Stork. William F. Cramer has been named superintendent of the airport, with Mr. Stork as assistant.

Random Observations OF AN AIR TOUR PASSENGER

By EDWARD P. WAGNER
Editor of Aviation

THE NATIONAL AIR TOUR, which has just wound up its fifth annual appearance upon the aeronautical calendar, has several distinct purposes. It is a test of the capacities of the aircraft, and of the reliability of their power plants and other essential accessories. It is a demonstration to the people of the states visited, and to the world at large through the press, of the remarkable uniformity with which modern air planes can travel a fixed course in accordance with a fixed schedule, and of the unlikelihood of their meeting with any unusual trouble in so doing. It is a traveling exhibition of modern aircraft, bringing machines of all sizes and types together to communities previously familiar with the appearance of only a few of the commoner standard makes, experiences which ordinarily would not encounter the new developments in airplane design used long after they had ceased to be production. An incidental result of the tour, although not one of the objects for which it was inaugurated, is the giving of a very pleasant trip to a considerable number of passengers, and the opportunity to all those participating of a lot of brand-new knowledge about the parts of the American aviation world and their people.

For touring, even more than racing, depends for its success and usefulness upon the adequacy of the publicity organization work. As for racing, the organization divides naturally into two main, more or less distinct parts. Publicity has to be carefully prepared if the aircraft industry is to get a proper return from the tour. A technical organization has to be perfected, not only at headquarters where the tour starts and finishes, but at every checking point along the route. If the winners are to be accurately determined and protests and matters avoided. There are general and miscellaneous details of arrangement, also spread over three odd cities, such as transportation, refreshment, local accommodations, the distribution of new information to the tour personnel, and a score of other details, individually small but collectively burdensome to the manager and his assistants.

The writer saw the tour as one of the fortunate passen-

gers with no responsibility, able to observe and to enjoy the scenery and the show. Unfortunately for himself he was only able to cover only approximately the first half of the schedule, going as far as Atlanta, but the journey was long enough to develop definite opinions on some phases of air racing in general and this tour in particular.

The avoidance of the technical organization is least criticized by the almost complete absence of complaint from the competitors. Arthur G. Schaefer, chief of cover, his associate Mr. Crocker, the stationmaster who reads the necessary regulations to determine the merit factors and to bring the results up to date every evening, and the other personnel, most of whom are responsible, were all highly appreciated. By their local aids in most of the cities visited. There were accurately recorded, and each pilot was given, before starting on his next leg, a few sheets showing the time allowed him for covering it and the comparison between himself and actual time on the previous stretch of the flight. Errors were occasionally, so say, competitors made under pressure, but in the current tour they have been very few, and have often been caught by the officials in checking their own work or notified immediately on being brought to their attention.

An unusual element of the management of the tour was the provision of a stopman committee of one for each airplane at each stopping place. The checkers so appointed is supposed to guide the machine to its place in the line and see it properly parked, check up on the

number of passengers and other load carried to make sure that it fulfills the contract requirements, and give any possible advice and assistance to the crew and passengers. The pilot checked out admirably in some cases, especially those where a sufficient number of aeronautical experts were readily available. In the Canadian section of the tour, for example, the members of the local light airplane clubs acted as checkers, and were they were familiar with the handling of airplanes they got the competing and accompanying craft off of the field and onto the parking lot with admirable efficiency and a minimum of delay.

The same was true in some American cities, particularly where local Aero clubs took over the task. In other cases it was necessary to call upon service clubs, chambers of commerce, Reserve Officers' associations or other miscellaneous organizations to provide checkers. The members gave generously of their time, and displayed an admirable enthusiasm and helpfulness, but were frequently handicapped by a complete lack of aeronautical knowledge, and functioned primarily as hosts and information bureaus. Although it is often quite unnecessary to find strange people with a first-hand knowledge of airplanes to amount to a small city with not very intense aeronautical activity, they should be found wherever possible. Despite the partly commercial nature of the tour, the American Legion could probably secure the effort of the services of a substantial number of ex-servicemen in most cities.

The driving up of heavy planes into a neat straight line twice each day, under the marshaling of Captain Hawks and without external assistance, afforded a beautiful demonstration of ground maneuverability. Different repeatedly considerable numbers on all the large machines the tour could hardly be run off at all. If airplanes had still to be guided to a place on a line, as five years ago, by manual pulling and hauling the confusion in handling forty planes in half an hour would be endless.

Mistake of the difficulty under which the checkers had sometimes to labor leads up naturally to the holder of the part of referee, for at some of the stops he did a large part of the work of the twenty-five checkers in addition to all of his own. No prize money was lost for Frank M. Hawks. His experience his skill as a pilot, his personal popularity, his tact and good judgment all combined to make things run smoothly and to keep everybody, both the tourists and their hosts, contented. From the time that he took off each morning, some two hours ahead of the body of the tour to prepare for its



Part of the amazingly large crowd at interesting operations at the new Springfield (Mass.) Airport.

arrival at the next stop and he got through providing the entertainment at the evening's banquet by introducing the pilots to their hosts. He was watching every detail and personally caring for many. One of the management's greatest problems had been solved when he came to serve as an official.

Crowds and Their Handling

THE INTEREST displayed in most of the cities visited was very encouraging in one sense, surprising in another. It was encouraging as evidence of an understanding, and of popular interest in perfectly straight transportation flying. It was surprising that there are still so many people who connected with aviation, and presumably not particularly interested in the constructional details of recent flights, to whom flying is still much of a novelty to find them to take the trouble to go out to the airport for such a purpose. There could have been no better evidence of the breadth of the field still open for the expansion of air transport and of the comparatively small depression that it has so far made upon the public. It was particularly striking that the size of the crowd at the field tended to vary inversely with the amount of aeronautical activity in the city. Springfield, which has a comparatively new airport and no regular air line, turned out a fairly overwhelming gathering. So, considering the size of the city and the fact that only a noon stop was made there did Omaha. Cities like Philadelphia, where commercial and military air operations have been much older, had proportionately smaller crowds on hand. The largest crowd of all was in Montreal, but that can hardly be taken into account, in establishing any rule, as an aviation meet was going on there and the arrival of the tour was only one event.

The uneven distribution of public interest suggests that the purposes of the tour will best be accomplished in future by keeping it away from great aeronautical



Captain Hawks has to have extreme good endurance.

centers. While of course the aviation enthusiasts will never lose interest in the tour in any city, and while they would all like to have it come to visit them every year, it is believed that in future visiting the greatest field goal will be done by visiting such cities as New York, St. Louis, Chicago, and Wichita in favor of more places like Portland, Worcester-Salem, Jacksonville, and others where there is great aeronautical ardor, but where it has difficulty in finding material enough upon which to feed.

However the tour be mounted in the future, it must be suggested upon local arrangements recognizing that the crowds must be kept under some control. The policing of the field during the first week of the late tour varied from approximate perfection to approximate zero. In a small town, among which Montreal and Springfield were especially notable because of the size of their crowds and because the limited amount of permanent housing around the field enhanced the policing problem, the spectators were kept rigorously back from the airfields at all times. In others, they were allowed to invade the field as soon as the planes had landed, and in such or three instances in the northern cities there was a virtual absence of any person of control of any kind. Men, women, and children rushed headlong about between the airplanes while their engines were being warmed up far too late, and the absence of fatalities by walking into propellers can be credited only to providential intervention. The crowds went to see the planes at short range, and if the tour is to accomplish its full mission for air transport they should have the opportunity, but they ought to be off the field soon every day, then moved into position and cut the service, and they ought to be off again before active preparations for the next-off are started. Performance there should be enough guards locally provided to keep visitors from climbing over the rail surfaces without imposing the duty of policing on already fatigued mechanics. There are frankly enough of perfection. It is evident that it is very difficult to get enough volunteers or enough of a value detail to have men everywhere that they are needed, but certainly local committees should realize that they are

accepting a serious responsibility in undertaking to receive the tour and that it is up to them to maintain proper conditions.

The local committees have as another of their duties the provision of transportation and accommodations. In most cases that part of the arrangements was well handled. Where it broke down it was usually because there was too much detailed organization and too little (unknowledge of what was going to happen to make the organization workable. The air tour management has now had less years of experience with these events. We should have realized the point where it became possible to study, define the procedure of guaranteeing transportation and lodging to those entitled to them. Some cities this year went to great trouble to have little books of tickets printed, and then found it impossible to find out who should get which book. In other cases the distribution of the books was entrusted to an individual who could seldom be located when wanted. In other instances badges were issued, supposed to cover everything. All this variety of credentials left the pilots and mechanics whose engines were supposed to be paid as each stop somewhat uncertain about what they were required to accept and where from, and the morning would sometimes find a number of them parking their own hotel bills in consequence. If all cities would see carefully the place to which a great amount of attention should be avoided, both for the tourists and for the reception committees and managers Ray Collins would have been spared a heavy burden. To avoid the necessity of having the manager carry a lot of pilots, mechanics, and officials around with him to be handled over to the local people on his arrival at each stop, some standardized and semi-universal identifying credential should be given to those entitled to official entertainment. If a definitely limited number of credential cards were issued, carrying a photograph or signature for identification, like the generalist passes at the Cleveland Races, the responsibility could be made entirely responsible for their safe-keeping and accommodations could be issued without delay to the holder of a card, but only upon its presentation. Something of the sort, arranged before the start of the tour, is apparently required to reduce the local loads upon the tour manager and upon the local organizations co-operating.

The pilots want not only lodging and meals, but also information about what is to happen next. The management assumed the task of providing route maps in all places. As far as the writer accompanied the tour that was working out very smoothly except in Canada and northern New England, where the failure of the supply of regular air maps left a number of pilots navigating through the White Mountains and a lot of thick weather with no aid other than a highway map hastily scamped up in Montreal on the morning of departure.

Maps do not always cover all the pilot's need for information, and confusion sometimes results from the difficulty of gathering all the flying personnel in one place at one time to receive information. It would be well if the national section that has accompanied the tour and performed such mobile service for some years past could in the future be supplemented by a clerical department and a light duplicating machine. To run off a stereographed information release for the pilots at each stop. A suitable machine capable of making a hundred copies of a brief release in fifteen minutes weighs only six pounds. An example of the difficulties of reaching everybody by word of mouth was offered whenever suggestions were to be made about the route. On the Toronto-Ottawa leg, for example, which passed for many years through wooded country in which landing fields would be sought in vain, Capt. Hawks had advised that everyone keep well to the north, near the lake shore, for two-thirds of the distance and then turn sharply to the southwest to Ottawa. To be sure, none of the pilots who did receive that information gave it out the slightest head, flying the airline and displaying their familiar faith in their power-plans, but a number were unable to resist ever having received the suggestion at all. The organization ought to consider the possibility that wherever there are more than five or fifteen persons available to get information and distribute it, it should be put into every pilot's hand in printed form.

Airports and Air-Making

A PASSENGER, from time any of the worries that might beset the pilot, could devote himself to surveying objectively the airport and away from the aircraft as revealed along the route. A comparison of this tour with that of two years ago, and the knowledge of what has gone on since 1957 at some of the fields then touched, leaves no doubt that airports are improving constantly. Not only are they increasing in numbers, but standards are being raised and landing areas enlarged. The only real criticism that could be made is that some of the facilities were so rolling as to be very disturbing to a pilot coming in with a heavily loaded airplane and having no previous experience with the local conditions, while others were too soft to be really suitable for large transport planes. The latter criticism, however, arose partly out of the great number of unladen handoffs on the tour and the responsibility of getting all of them down on narrow runways when several were coming in to land simultaneously. Where the field surface is such good runways are in almost all cases either new in construction or scheduled for the near future although the Canadian seem inclined to hold with the European theory that runways are not ad-



The tour planes lined up at Roosevelt Field, New York.

quate and that the entire landing area should be of uniform quality.

Leaving out of consideration the very largest drain, the airport problem of which are well known, most of the examination visited had selected their sites with the report to the importance of having a good place to get to the place where the most time-saving of all vehicles is to be entered. Only in very few instances did it take over fifteen minutes to travel between airport and hotel or railroad station. The most complex exception is that took occurred in Montreal, where the time required to reach the city was from one and a half to three and a half hours, but these abnormal delays were attributable less to location of the airport, although it is rather far out from the city, than to the evaluation which had more than 30,000 people out to the field on the afternoon of the tour's arrival and produced a complete blockage of the highway. The approaches to the airport at St. Hubert are most unsatisfactory, but that is a situation with which the Dominion's aeronautical authorities are valiantly struggling.

Airports, so far as they appeared along the tour, are possibly good, although of course some cities seem to have fairly satisfactory fields were included in the itinerary. Not so much can be said for the surrounding towns, concerning which there has been much conversation and collaboration during the last ten or three years. During the first eight days of the tour the plane passed over some hundreds of cities and villages of varying size, and except in a probably few instances they rarely failed to reveal some of their best from the air. The Post Office Department, the American Legion, the Goodwill Foundation, the Exchange Club, and various other national organizations have existed themselves upon air-seeing propaganda. Montreal by airplane standards the results of their campaign have no doubt been very considerable, but the communities merely are spread out so thickly over the United States, at least in the Atlantic Coast area, that the pilot, being by way out some hours will occasionally fortunate if he happens to come within sight of a real airport. Inquiry among a number of pilots and passengers on the tour failed to reveal any individual who had seen more than four or five marked towns in some 2,500 miles of flying, and their collective reports



When the road and a chance to see the mechanics—Montreal scene.

put together showed less than a dozen such views observed in all, most of them in New England and in Georgia.

The Power of the Torus

THE TORUS always offers the designer for a great amount of discussion of how the rules can be improved for next time, both as to general provisions and lay-out of course and as to the detailed application of the formula for picking the prize winners.

There are some general considerations which should be imposed on all competing machines to insure that they are of genuine commercial types, either for transport or for private operation. Among other things there should be absolute insistence upon the provision of a starter. It is very disturbing in these days to see an engine being started by cranking the propeller with the action on in a commercial reliability test in the year 1929 there is no possible excuse for such a maneuver. The prohibition of handling the propeller to start should be absolutely rigid.

Another subject that calls for constant consideration by the management is the classification and division into groups of the competing planes. Aircrafts now vary so much in size, performance and intended function that it is quite hopeless to get them all in an equal footing together in any sort of competition. It is clear that the use of the division is at hand, and that there should be at least two classes for multi-engine transport planes, for single-engine cabin machines and for those with open cockpits, corresponding in general to the three purposes of airline operation, private transportation, and sport flying.

The writer once believes that it would be desirable to consider sending the several courses over different routes, at least in part. The number of planes appearing on the tour has tended steadily to increase. It is already so now that the racing becomes a double-sided tournament in a small city. Assuming that the fleet will continue to grow larger, more good would be done if half as many planes could cover twice as many cities, especially as there are some communities which particularly need measurement and have fields adaptable for receiving a group of small planes but not of such size or stature as to make them safe for use by transport types.

Another advantage of splitting up the group would be that multi-engine machines, when enough of them shall be participating to make a satisfactory race by themselves, could be sent over a route that would be dangerous for planes depending upon a single power-plant. A grave question of policy is involved in routing the tour over such areas as those between Toronto and Montreal, Montreal and Portland, Augusta and Jacksonville, etc. On any one of the above there were stretches of many miles with no possible landing places within such stretches where an engine failure on any single-engine plane would have instant and serious results. No doubt occurred and the fact is such to the credit of the reliability of the modern aircraft power-plant, but failures will never be unknown in any mechanism and the writer believes that it is unwise in the long run to try the course of single-engine planes over any territory requiring the pilots to make emergency landings for a considerable period. It can be argued that many of the passengers of the planes would have to be prepared to fly over that kind of country, but they can take the responsibility for their own acts. It is the conduct of the air tour the responsibility is with the management.

and the management has to do everything possible to cut the likelihood of serious crash down to the very limit. Furthermore, the private traveler by air is not under the same temptation to keep pushing along in spite of minor indications of trouble as is an aircraft flying to a certain schedule, and it is so likely to seek to reduce the effect of head wind by dropping down to skim along a levelled feet above the tree-tops and the towers.

There is not one of the factors that has been mentioned here that does not vitally effect the mechanics of the tour or the convenience or happiness of the competitors. All of them together, however, have hardly constituted so much discussion as the total form of the formula by which the scores are determined.

Whatever possibilities of improvement in that formula may be found now, upon its past history it must be accepted as a masterpiece. For ten years it has remained without fundamental change. That probably sets a world's record.

The present formula is:

$$\text{Merit} = \frac{80 \times \text{speed} \times \frac{\text{load}}{\text{cubic displacement}}}{\frac{\text{“landed” time} + 2}{\text{“stick” time}}}$$

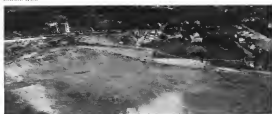
In explanation, and the precise type of design that it favors, are to be found the subject of detailed study in a future article. For the present it is necessary only to consider either briefly what qualities are most desired in a transport plane, and to see how they enter into the present rule.

Broadly speaking, economy, safety, and speed are the qualities most sought. Speed enters the formula directly. Safety is favored by a liberal reserve of power and by a low landing speed. Both of those characteristics enter into the determination of take-off or “stick” time, and the latter of the two is the principal determinant of “stick” time. In giving great weight to the time required for getting into the air and for coming to rest after landing, the formula is steering elements very favorable to safety.

Economy and the Torus Formula

IT HAS already without strain upon economy in making the figure of merit proportional to the useful load carried per unit of power. The economy factor might well be introduced more directly by the inclusion of fuel consumption in the formula. The suggestion is one from which there will be expense in the technical management of competitors almost a total release. The opportunity for error on the part of air-sharks at observance on the part of the committee is reduced, but under proper conditions they can be guarded against. It would be quite unexpedient to measure the total fuel consumption of the fly around the tour, but it might well be taken for a few selected legs, measuring points at which it is known that local authorities will be able to make correct measurements can be secured. If the large cities are well to be included in the route, it should be possible at New York, Chicago, or St. Louis, for example to get an absolute check on the amount of fuel just taken every tank, and then either to add the tanks or to produce a useful logarithm as an insurance against intermediate landings for refueling.

To take fuel consumption along the route into account would overcome one of the most serious defects of the tour, the fact that it is now possible to determine the winner with some accuracy before the tour starts. There



Washington Airport, October 8. Jack takes the departure for New York.

are always at least half the competitors who know in some of their figures of merit are determined that they have an early chance, however superfluous their efforts thereafter, to finish within the prize-winning group. The pilot obtaining the highest figure of merit is not necessarily the winner of the tour, but he knows in advance that he cannot lose if he keeps on his course and has no mechanical trouble. In the course event the first three places went to the three machines ranking the highest figures of merit, and in the same order. So much predestination takes the edge off of the tour as a contest.

Wherever else may go into the formula, the “stick” and “aircraft” times should remain in some form. Their original inclusion was a stroke of genius. They are comparatively easy to measure, they are simple enough so that everyone can understand what is being done, and they promote the entry of planes having certain good mechanical characteristics. It is, of course, possible to construct one commercial quality at the expense of another. The weight given to the “stick” time was reduced in the rule for this year's tour because of a feeling that members of a new, light wing loading and with comparatively powerful engines had been put in an unduly favorable position in the past.

Taking it for granted that the measurement of landing and take-off time is to continue to play a part, the out-of-control nature of the tour results could be reduced by making a liberal deduction of those times at various points along the route. Some of the pilots have suggested that stick and airtime ought to be measured at every control. That would be mechanically impracticable, but the work could well be done at four or five selected points and a fairly result would be obtained. If the members of several different kinds of fields were used in getting the figures. In a single measurement such may depend on hole and the time taken on the concrete runways of the Port airport will not necessarily be as true as proportion to those on the more ordinary surfaces of clams or mud.

Limitation of Center Load

EXTREMELY well be made to the suggested proposal of measurement of stick and airtime time on the ground of danger if full load has to be carried throughout the tour. As present a 25 per cent reduction in the center load is permitted in the interest of safety, a ruling introduced since the experiences of 1926 and 1927, when some

pilots took off with such enormous center loads that they could hardly stagger into the air within the confines of the smallest fields used. The way out of that dilemma is obvious.

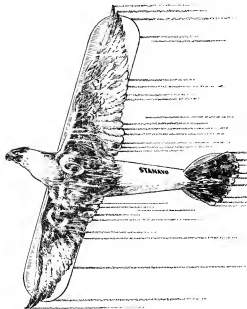
The present limitation of the center load to the figure permitted by the Department of Commerce approved type certificate goes only indirectly to the point of interest. The structural factor is the one primarily limiting the Department of Commerce's approval upon the load to be carried. Structural safety must of course be taken for granted, but in the tour it is the limitations on load imposed by performance which are of interest. The writer suggests that no machine should be permitted to load its merit factor upon a unitless time of over twelve seconds. If the time taken in the first trial exceeds that figure, the pilot should be required to reduce his center load and try again until he gets below the allowed maximum. The full center load could then be carried throughout the tour with perfect propriety.

A rather casual survey of the formula's working, without detailed mathematical analysis, suggests only one additional change is desirable. There should be no more run very short legs. It is quite absurd to permit a pilot a half fifteen per cent of his figure of merit for being a minute late to take off when the flag drops, yet such a penalty would have been almost inevitable on the Detroit-Windsor leg this year. The director and the time-keepers being so short that not even by flying at full throttle could a pilot have made up for more than a few seconds of time lost in taking off or climbing. It would be best to have no legs less than thirty miles length in the future, or if it is necessary to fly a shorter distance than that two legs should be pooled together upon a basis of total flying time and treated as a single one for computing the score.

The tour can no doubt be improved and will be, but it stands now as probably the most valuable of American competitive events in its real effect upon the development of the aircraft industry and of public interest in commercial aviation. The extensive adoption of competitive reliability tests in other parts of the world is the best evidence of the general high opinion of their value. The event will continue a useful and an important one for many years to come, and any reader who has a chance of going along with the commercial agency next year should insist upon its without delay.

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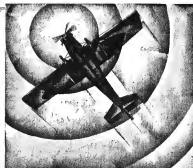
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316 S.	600	1/2	1/8	6.00	6.60
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316 S.	1000	1/2	1/8	10.00	11.00
316 S.	1100	1/2	1/8	11.00	12.10
316 S.	1200	1/2	1/8	12.00	13.20
316 S.	1300	1/2	1/8	13.00	14.30
316 S.	1400	1/2	1/8	14.00	15.40
316 S.	1500	1/2	1/8	15.00	16.50
316 S.	1600	1/2	1/8	16.00	17.60
316 S.	1700	1/2	1/8	17.00	18.70
316 S.	1800	1/2	1/8	18.00	19.80
316 S.	1900	1/2	1/8	19.00	20.90
316 S.	2000	1/2	1/8	20.00	22.00
316 S.	2100	1/2	1/8	21.00	23.10
316 S.	2200	1/2	1/8	22.00	24.20
316 S.	2300	1/2	1/8	23.00	25.30
316 S.	2400	1/2	1/8	24.00	26.40
316 S.	2500	1/2	1/8	25.00	27.50
316 S.	2600	1/2	1/8	26.00	28.60
316 S.	2700	1/2	1/8	27.00	29.70
316 S.	2800	1/2	1/8	28.00	30.80
316 S.	2900	1/2	1/8	29.00	31.90
316 S.	3000	1/2	1/8	30.00	33.00
316 S.	3100	1/2	1/8	31.00	34.10
316 S.	3200	1/2	1/8	32.00	35.20
316 S.	3300	1/2	1/8	33.00	36.30
316 S.	3400	1/2	1/8	34.00	37.40
316 S.	3500	1/2	1/8	35.00	38.50
316 S.	3600	1/2	1/8	36.00	39.60
316 S.	3700	1/2	1/8	37.00	40.70
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ALPHABETICAL INDEX TO ADVERTISEMENTS

Number	Name	Number
1	Am. Airport Co.	101
2	Am. Airport Co.	102
3	Am. Airport Co.	103
4	Am. Airport Co.	104
5	Am. Airport Co.	105
6	Am. Airport Co.	106
7	Am. Airport Co.	107
8	Am. Airport Co.	108
9	Am. Airport Co.	109
10	Am. Airport Co.	110
11	Am. Airport Co.	111
12	Am. Airport Co.	112
13	Am. Airport Co.	113
14	Am. Airport Co.	114
15	Am. Airport Co.	115
16	Am. Airport Co.	116
17	Am. Airport Co.	117
18	Am. Airport Co.	118
19	Am. Airport Co.	119
20	Am. Airport Co.	120
21	Am. Airport Co.	121
22	Am. Airport Co.	122
23	Am. Airport Co.	123
24	Am. Airport Co.	124
25	Am. Airport Co.	125
26	Am. Airport Co.	126
27	Am. Airport Co.	127
28	Am. Airport Co.	128
29	Am. Airport Co.	129
30	Am. Airport Co.	130
31	Am. Airport Co.	131
32	Am. Airport Co.	132
33	Am. Airport Co.	133
34	Am. Airport Co.	134
35	Am. Airport Co.	135
36	Am. Airport Co.	136
37	Am. Airport Co.	137
38	Am. Airport Co.	138
39	Am. Airport Co.	139
40	Am. Airport Co.	140
41	Am. Airport Co.	141
42	Am. Airport Co.	142
43	Am. Airport Co.	143
44	Am. Airport Co.	144
45	Am. Airport Co.	145
46	Am. Airport Co.	146
47	Am. Airport Co.	147
48	Am. Airport Co.	148
49	Am. Airport Co.	149
50	Am. Airport Co.	150
51	Am. Airport Co.	151
52	Am. Airport Co.	152
53	Am. Airport Co.	153
54	Am. Airport Co.	154
55	Am. Airport Co.	155
56	Am. Airport Co.	156
57	Am. Airport Co.	157
58	Am. Airport Co.	158
59	Am. Airport Co.	159
60	Am. Airport Co.	160
61	Am. Airport Co.	161
62	Am. Airport Co.	162
63	Am. Airport Co.	163
64	Am. Airport Co.	164
65	Am. Airport Co.	165
66	Am. Airport Co.	166
67	Am. Airport Co.	167
68	Am. Airport Co.	168
69	Am. Airport Co.	169
70	Am. Airport Co.	170
71	Am. Airport Co.	171
72	Am. Airport Co.	172
73	Am. Airport Co.	173
74	Am. Airport Co.	174
75	Am. Airport Co.	175
76	Am. Airport Co.	176
77	Am. Airport Co.	177
78	Am. Airport Co.	178
79	Am. Airport Co.	179
80	Am. Airport Co.	180
81	Am. Airport Co.	181
82	Am. Airport Co.	182
83	Am. Airport Co.	183
84	Am. Airport Co.	184
85	Am. Airport Co.	185
86	Am. Airport Co.	186
87	Am. Airport Co.	187
88	Am. Airport Co.	188
89	Am. Airport Co.	189
90	Am. Airport Co.	190
91	Am. Airport Co.	191
92	Am. Airport Co.	192
93	Am. Airport Co.	193
94	Am. Airport Co.	194
95	Am. Airport Co.	195
96	Am. Airport Co.	196
97	Am. Airport Co.	197
98	Am. Airport Co.	198
99	Am. Airport Co.	199
100	Am. Airport Co.	200

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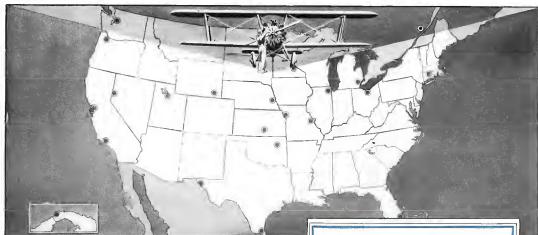
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Where to Fly

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